UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/805,770	03/22/2004	Michael Durr	282743US8X	1234

22850 7590 10/21/2010

OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
TAI, XIUYU	
ART UNIT	**PAPER NUMBER**
1759	

NOTIFICATION DATE	DELIVERY MODE
10/21/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No.	Applicant(s)	
	10/805,770	DURR ET AL.	
	Examiner	Art Unit	
	Xiuyu Tai	1759	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 August 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,6-11 and 20-34* is/are pending in the application.

4a) Of the above claim(s) *25-34* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1.6-11, 20-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Due to applicant's amendment, the objection to drawings and the rejections to claims 4, 12, 13, 15, 17, and 18 are withdrawn.

2. Applicant's arguments with respect to claim1, 6-11, and 20-24 have been considered but are moot in view of the new ground(s) of rejection necessitated by applicant's amendment.

3. In response to the arguments that the scattering strength of Chiba is constant in the second and subsequent layers (see page 11 of REMARKS), Chiba teaches that the porous layer has a multi-layer structure comprising particles having different diameters that are sequentially increased from a light receiving surface (paragraph [0016], claim 3), resulting in the increase of light scattering strength sequentially. Thus, the scattering strength of Chiba varies from layer to layer.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1, 6-11, and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiba et al (PG-PUB US 2002/0134426).

8. Regarding claim 1, Chiba et al disclose a dye-sensitized solar cell comprising a porous semiconductor layer having a multi-layer structure (ABSTRACT). A porous layer 3 (i.e. a film) for a solar cell has a light-receiving surface (i.e. a front surface) and a surface away from the light-receiving surface (i.e. a back surfaces, Figure 1, paragraph [0023]). Chiba teaches that the porous layer has a multi-layer structure including first, second, and subsequent layers (i.e. a plurality of layers, paragraph [0033]) and the multi-layer structure comprises particles having different diameters that are sequentially increased from a light receiving surface (i.e. particle diameters increase from layer to layer, paragraph [0016], claim 3), wherein

(a) the first layer has small primary particles while the second and the subsequent layer may have larger particles containing small primary particles and secondary large particles (i.e. each layer having the first kind of particles and a second kind of particle, and the first layer having no the second kind of particles, paragraph [0034]);

(b) the first layer (i.e. the front surface) scatters light as little as possible while the second layer and subsequent layer (i.e. the back surface) has larger particles to scatter more light (i.e. a gradient of light scattering strength increase from front to back surface, paragraph [0030] – [0031]) and the light is not scattered by the first layer (i.e. zero light scattering strength at the front surface, paragraph [0031]).

Chiba does not specifically disclose the diameter or amount of the large secondary particles in the subsequent layers being further increased. However, Chiba teaches that particle diameters in the sequent layers are sequentially increased from a light receiving surface (paragraph [0016], claim 3). Chiba also teaches that the large particles may be obtained by mixing small primary particles and large secondary particles (paragraph [0035]). Chiba further indicates that the haze ratio of the porous layer can be controlled by changing the mixing ratio of particles having different diameters and by changing the particle diameter (paragraph [0034]) in order to improve the performance of the solar cell (paragraph [0012])., Therefore, one having ordinary skill in the art would have envisioned to further increase the particle diameters in the sequent layer by either increasing the amount of the secondary large particles or increasing the diameter of the secondary large particles in order to improve the

performance of Chiba. As a result, the multi-layer structure of Chiba has a first layer with small particles only, a second layer containing small primary particles and large secondary particles, the sequent layer having small primary particles and even larger secondary particles, wherein the first layer is on the light receiving side (Figure 1, paragraph [0023]).

Chiba does not specifically disclose continuous gradient of light scattering strength. However, Chiba teaches that particle diameters in the sequent layers are sequentially increased from a light receiving surface (paragraph [0016], claim 3), resulting in increasing the scattering strength from the light receiving surface, thus improving the performance of the solar cell (paragraph [0030]). Therefore, one having ordinary skill in the art would have realized to change the scattering strength continuously along the film by varying particle size and amount present in the film in order to confine the sunlight, hence improving conversion efficiency of the solar cell of Chiba..

9. Regarding claim 6, the particles in the first and the second layers have different diameters, implying sphere-shaped particles (paragraph [0030]).

10. Regarding claim 7, the porous layer 3 may contain semiconductor material (paragraph 0026]).

11. Regarding claim 8, the multi-layer structure has the first layer 4, the second layer 5, and subsequent layers (paragraph [0016] & [0033]).

Regarding claim 9, the multi-layer structure has the first layer 4, the second layer 5, and subsequent layers (paragraph [0016] & [0033]), which are applied subsequently

by doctor blading method (Examples 1-12). The claim contains product (the film) by process (screen printing, doctor blading...). Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process (*In re Thorpe* and MPEP § 2113).

12. Regarding claim 10, the reference teaches that the first layer may contain the particles with a primary diameter of 20 nm (paragraph [0077]).

13. Regarding claim 11, the second layer may contain the particles with a particle diameter about 180 nm (paragraph [0081]).

14. Regarding claim 20, the porous layer 3 of Chiba is used in a dye-sensitized solar cell (i.e. an electronic device, Figure 1, paragraph [0023]).

15. Regarding claim 21, the porous layer 3 of Chiba is used in a dye-sensitized solar cell (Figure 1, paragraph [0023]).

16. Regarding claim 22, the dye-sensitized solar cell of Chiba includes a counter electrode layer to reflect light (Figure 1, paragraph [0064]).

17. Regarding claim 23, the dye-sensitized solar cell of Chiba includes an electro-conductive film 2 to allow light transmit within the solar cell (Figure 1, paragraph [0024]).

18. Regarding claim 24, the dye-sensitized solar cell of Chiba includes a hole transporting layer 6 containing an electrolyte (Figure 1, paragraph [0023] & [[0065]).

Conclusion

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiuyu Tai whose telephone number is 571-270-1855. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/X. T./
Examiner, Art Unit 1759

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1723